

English machine translation of Reference 4 -- Japanese Patent Application Laying Open (KOKAI) No. 2000-177379, provided by JPO and INPIT:

Application number : 2000-377465

Publication number : 2002-177379

Date of publication of application : 25.06.2002

Applicant : SEKISUI CHEM CO LTD

Date of filing : 12.12.2000

Invention name: AUXILIARY INSTRUMENT FOR HUMOR SUCTION

Int.Cl. A61M 1/00 A61B 17/00

Inventor : NAKAIZUMI MASAHIRO

[Claim(s)]

[Claim 1]A tube-like object in which a hypodermic needle is attached to one end, the opening of the other end is carried out, and a flange is provided in this periphery of an opening, It is being fixed at a tip of a bar member inserted into said tube-like object, and this bar member, and connects with an outer tip of a head which it is contacted and is moved to inner skin of a cylindrical member, and said bar member, Are a body fluid suction technical aid which is combined with a syringe provided with a plunger which has a handle which has the portion prolonged in the side, and is used rather than a bar member, and A flange of said cylindrical member, If it is arranged between handles of said plunger, it has an air current inlet and air flows from this air current inlet, A plunger driving member which moves a plunger to shaft orientations of a bar member so that a handle of a plunger may be kept away to a flange, A body fluid suction technical aid equipping a plunger driving member with a compressed-air-supply member which supplies compressed air by connecting with an air current inlet of said plunger driving member, and being operated with hand control or foot.

[Claim 2]The body fluid suction technical aid according to claim 1 in which said plunger driving member is an air cylinder.

[Claim 3]The body fluid suction technical aid according to claim 2 in which said air cylinder is a multistage type air cylinder.

[Claim 4]The body fluid suction technical aid according to claim 1 which is a balloon in which said plunger driving member has pliability.

[Claim 5]The body fluid suction technical aid according to any one of claims 1 to 4 which is a rubber bulb with a check valve which discharges compressed air by squeezing said compressed-air-supply member.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the body fluid suction technical aid used for

attracting and extracting body fluid from a patient or a test subject using a syringe.

[0002]

[Description of the Prior Art]In extracting body fluid from a patient or a test subject conventionally, various methods are used. But a simple method is a method of attracting and extracting body fluid, by attaching a hypodermic needle to a syringe, carrying out the puncture of the hypodermic needle to the body of a patient or a test subject, and pulling out the plunger of a syringe from the cylindrical member of a syringe by hand.

[0003]But on the occasion of suction of body fluid, comparatively big power is taken to pull out a plunger from the cylindrical member of a syringe. In the case of the syringe which has the content volume of large scale, i.e., 30mL, and 50mL especially, when attracting body fluid, the plunger needed to be pulled by big power. In order to attract mass body fluid, comparatively long time is required when drawing in. For example, when attaching 21G hypodermic needle 0.8 mm in diameter to the syringe of 50mL capacity with a 30 mm[in inside diameter] x length of 75 mm and collecting blood from a vein, it is necessary to continue pulling for 1 to 2 minutes by the power of about two to 4 kgf.

[0004]While having pulled the plunger by big power, it is necessary to hold so that a hypodermic needle may not be moved. Therefore, the burden of workers, such as a nurse, was dramatically heavy.

[0005]The syringe pump is also used in order to ease the work burden for above body fluid suction and extraction. When using a syringe pump, a butterfly needle for a syringe to be set and extract the syringe and body fluid which are set is connected with a syringe pump by a silicone tube etc. If a syringe pump is used, a plunger will be drawn out by power from the cylindrical member of a syringe, and body fluid will be attracted and extracted. Therefore, the burden of workers, such as a nurse, is remarkably mitigable.

[0006]

[Problem(s) to be Solved by the Invention]However, when a syringe pump is used, an expensive butterfly needle must be used. Therefore, in the actual condition that reduction of health care costs is called for, using a hypodermic needle cheaper than a butterfly needle is called for. When a butterfly needle is used, medical waste also increases compared with a hypodermic needle.

[0007]In addition, a syringe pump cannot be used when a power supply cannot be secured in the time of a disaster, etc. In the case where many people suffer a great deal of damage etc., there is also a possibility that the number of a syringe pump may run short.

[0008]The purpose of this invention is replaced with the syringe pump which needs power in view of the actual condition of the conventional technology mentioned above, It is in providing the body fluid suction technical aid which can ease remarkably the burden of workers, such as a nurse for [can extract body fluid easily using the syringe to which the hypodermic needle was attached, and] suction and extraction of body fluid.

[0009]

[Means for Solving the Problem]A body fluid suction technical aid concerning this invention is combined and used for a syringe to which a hypodermic needle was attached. Namely, a body fluid suction technical aid concerning this invention, A tube-like object in which a hypodermic needle is attached to one end, the opening of the other end is carried out, and a flange is provided in this periphery of an opening, It is being fixed at a tip of a bar member inserted into said tube-like object, and this bar member, and connects with an outer tip of a head which it is contacted and is moved to inner skin of a cylindrical member, and said bar member, Are a body fluid suction technical aid which is combined with a syringe provided with a plunger which has a handle which has the portion prolonged in the side, and is used rather than a bar member, and A flange of said cylindrical member, If it is arranged between handles of said plunger, it has an air current inlet and air flows from this air current inlet, A plunger driving member which moves a plunger to shaft orientations of a bar member so that a handle of a plunger may be kept away to a flange, It connects with an air current inlet of said plunger driving member, and a plunger driving member is equipped with a compressed-air-supply member which supplies compressed air by being operated with hand control or foot.

[0010]In this invention, the above-mentioned plunger driving member can be constituted so that it may have various structures, but is constituted from a specific aspect of affairs of this invention by air cylinder, and is constituted from a more restrictive aspect of affairs by multistage type air cylinder.

[0011]The above-mentioned plunger driving member is constituted from other specific aspects of affairs of a body fluid suction technical aid concerning this invention by balloon which has pliability. The above-mentioned compressed-air-supply member is constituted from an aspect of affairs of a body fluid suction technical aid concerning this invention where others are still more specific, by squeezing by rubber bulb with a check valve which can discharge compressed air.

[0012]

[Embodiment of the Invention]Hereafter, this invention is clarified by describing concrete working example of the body fluid suction technical aid concerning this invention, referring to Drawings.

[0013]Drawing 1 is schematic illustration drawing of longitudinal section showing the state where the body fluid suction technical aid concerning one working example of this invention was combined with the syringe. The initial state before body fluid suction is shown by drawing 1.

[0014]The syringe 1 is provided with the following.

Cylindrical member 11.

Plunger 15.

The cylindrical member 11 has approximately cylindrical shape, and has the hypodermic needle mounting part 12 at a tip. The hypodermic needle 13 is attached to the hypodermic needle mounting part 12.

[0015]The opening 11a is formed and the flange 14 prolonged outside in the periphery of the

opening 11a is formed in the other end side of the cylindrical member 11. The bar member 16 of the plunger 15 is inserted so that it may extend in the above-mentioned cylindrical member 11. The head 17 is connected at the tip of the bar member 16. As for the head 17, airtight contact of the peripheral face is carried out with the inner skin of the cylindrical member 11. Therefore, when the plunger 15 is pulled out and the head 17 moves up, the space which comprises a portion by the side of the hypodermic needle 13 rather than the apical surface of the head 17 and the head 17 of the cylindrical member 11 is decompressed, and it is constituted so that body fluid may be attracted.

[0016] On the other hand, the handle 18 is connected with the outer tip of the bar member 16. The handle 18 is usually a portion grasped by the hand of workers, such as a nurse, and holds the handle 18 with fingers, and operation which pulls out the plunger 15 from a cylindrical member is performed.

[0017] It can do [using suitably the syringe and hypodermic needle which are conventionally used widely as the above-mentioned syringe 1 and the hypodermic needle 13, or], and is not limited in particular. The body fluid suction technical aid 21 of this example is combined with the above-mentioned syringe 1, is used, and has the compressed-air-supply member 23 connected with the plunger driving member 22 and the plunger driving member 22.

[0018] The plunger driving member 22 is arranged between the upper surface of the flange 14 of the cylindrical member 11, and the upper surface of the flange 14 and the undersurface of the handle 18 which has countered. The plunger driving member 22 is constituted from this example by the multistage type air cylinder. The details of this plunger driving member 22 are explained with reference to drawing 3. The plunger driving member 22 has four SHIRINNDA 24-27. The four cylinders 24-27 differ in a path, and they are constituted by nesting form as shown in drawing 3. That is, the cylinders 25-27 in which the path becomes small at order are inserted into the cylinder 24 which has the biggest path. The air current inlet 24a is formed in the cylinder 24 which has the biggest path. As the arrow of a graphic display shows from the air current inlet 24a, when compressed air is supplied, the cylinders 25-27 with a small path let out from the cylinder 24.

[0019] The annular lock projections 25a-27a prolonged outside are formed in the back end of the cylinders 25-27, respectively. On the other hand, the openings 24a, 25b, and 26b are formed in the front end of the cylinders 24-26. The path of these openings 24a, 25b, and 26b is made smaller than the path of the annular lock projections 25a-27a. Therefore, when the cylinders 25-27 let out, and the above-mentioned annular lock projections 25a-27a and the inner surface of the edge part of the openings 24a, 25b, and 26b contact, it is constituted so that the cylinders 25-27 may not fall out from the cylinders 24-26.

[0020] In this example, when the maximum delivery of the cylinders 25-27 is carried out, the handle 18 shown in drawing 1 will keep away from the flange 14 most. In this case, the overall length of the plunger driving member 22 at the time of the maximum delivery of the

above-mentioned cylinders 25-27 being carried out is defined so that the cylindrical member 11 may not fall out in the head 17.

[0021]It returns to drawing 1 and two or more plunger driving members 22 are arranged in the circumference of the bar member 16 of the plunger 15 in this example. And the tube 28 which has pliability is connected with the air current inlet 24a (drawing 3) of each plunger driving member 22. Proper synthetic resin materials, such as silicone resin or soft polyvinylchloride resin, can constitute the tube 28.

[0022]The three-way cock 29 is formed in the middle of the tube 28. As for the side connected with the cylinder 22 of the tube 28, the compressed-air-supply member 23 mentioned above is connected with the end of the opposite hand. The compressed-air-supply member 23 comprises a rubber bulb which consists of crude rubber and a synthetic rubber, for example. The check valve 30 is connected with the compressed-air-supply member 23. Although it is open in the direction which draws air into the compressed-air-supply member 23, the check valve 30 is constituted so that it may not discharge outside via the check valve 30 from the compressed-air-supply member 23.

[0023]Therefore, by squeezing the compressed-air-supply member 23 by hand, compressed air can be supplied to the plunger driving member 22, and it is supposed that it is possible to let out the cylinders 25-27 of the plunger driving member 22 by it.

[0024]By an initial state, it changes the three-way cock 29 into the state of making the compressed-air-supply member 23 and the plunger driving member 22 opening for free passage, and after the operation which pulls out the plunger 15 is completed, he is switched so that air may be missed from the plunger driving member 22 and the tube 28.

[0025]Next, the operation method of the body fluid suction technical aid of this example is explained with reference to drawing 1 and drawing 2. The three-way cock 29 is making the compressed-air-supply member 23 and the plunger driving member 22 open for free passage in an initial state, as mentioned above. In this state, the hypodermic needle 13 is thrust into a patient or a test subject, and multiple-times squeezing of the compressed-air-supply member 23 is carried out by hand. As a result, compressed air is supplied to the plunger driving member 22 from an air current inlet, and as shown in drawing 2, the cylinders 25-26 let out. Therefore, the handle 18 of the plunger 15 keeps away from the flange 14, it is moved to the shaft orientations of the bar member 16, and the plunger 15 is pulled out. Therefore, the big operation of a burden which pulls out the plunger 15 from the cylindrical member 11 by hand is not needed, but suction and extraction of body fluid can be performed easily.

[0026]After attracting and extracting body fluid, the plunger driving member 22 can be easily returned to an initial state by opening the three-way cock 29 and missing the compressed air in the plunger driving member 22.

[0027]Therefore, if the body fluid suction technical aid 21 of this example is used, the burden of workers, such as a nurse, is remarkably mitigable. And since a power supply etc. are not needed,

it can do [using easily and simple also in the time of a disaster, etc., or].

[0028]Although not limited in particular for the material which constitutes the above-mentioned plunger driving member 22, since it is cheap lightweight, what consists of synthetic resins is used in this example. But the plunger driving member 22 may be constituted by metal, such as stainless steel. In this example, although the multistage type air cylinder was used as a plunger driving member, the number of the cylinders which it lets out may use the air cylinder of one step type which is the singular number.

[0029]Although the multistage type air cylinder was used, it may replace with the multistage type air cylinder 22, and may consist of flexible materials, such as rubber, and the balloon which expands by introducing compressed air may constitute the plunger driving member 22 from this example.

[0030]In this example, although the compressed-air-supply member 23 is constituted by the rubber bulb which has the pliability which can be squeezed by hand, it may be replaced with the compressed-air-supply member 23 which generates compressed air by squeezing, and the air cylinder of hand control or a step type may be used for it. Namely, what is necessary is for this air cylinder just to consist of smaller power by adjusting the capacity of an air cylinder, compared with the power which pulls out the plunger 15 from the cylindrical member 11 by hand, so that a plunger driving member may be driven.

[0031]Although not limited in particular for the method of combining the above-mentioned plunger driving member 22 with the syringe 1, Velcro (registered trademark) 31 shown in drawing 4 is used preferably. Here, the four plunger driving members 22 are arranged on Velcro 31. And as shown in drawing 5 (a) and (b), so that the plunger driving member 22 may be held, The four plunger driving members 22 can be arranged fixed around the bar member 16 by fixing the peripheral face by the side of winding and one end of Velcro 31, and the inner skin by the side of the other end for Velcro 31.

[0032]Since the cross section is made into approximately cross shape in drawing 5 (a) as for the bar member 16, Each plunger driving member 22 is arranged at each crossing portion of this approximately cross shape shape, and it is arranged by it fixed, without being as large as a difference and the four plunger driving members 22 carrying out the whole path on Velcro 31.

[0033]Although the amount of deliveries of the cylinders 25-27 in the plunger driving member 22 was regulated in above-mentioned working example by stop with the annular lock projections 25a-27a mentioned above and the edge part of the openings 24a, 25b-26b, In order to prevent omission from the cylindrical body 11 of the plunger 15, the stopper of other gestalten may be formed in the plunger driving member 22. For example, what is necessary is just to attach to a balloon the stopper which regulates expansion of this balloon, when the plunger driving member 22 is constituted by the balloon.

[0034]

[Effect of the Invention]In the body fluid suction technical aid concerning this invention, to the

plunger driving member arranged between the flange of the cylindrical member of a syringe, and the handle of a plunger. The compressed-air-supply member is connected and compressed air can be supplied to a plunger driving member by operating this compressed-air-supply member with hand control or foot. If compressed air is supplied, a plunger driving member will drive a plunger, and it will be moved so that the flange whose handle of a plunger is a cylindrical member may keep away, and suction and extraction of body fluid will be performed by it.

[0035]Therefore, compared with the conventional body fluid sucking operation which pulls out a plunger, it becomes possible from a syringe to ease the burden of workers, such as a nurse, remarkably by hand. In addition, with the body fluid suction technical aid concerning this invention, power, such as a power supply, is not needed to needing a power supply in a syringe pump. Therefore, it can do [using promptly the body fluid suction technical aid concerning this invention, or] also in the situation where a power supply is not securable in the time of a disaster, etc.

[0036]Since it can do [using the syringe to which the hypodermic needle currently used widely from the former was attached or] and a member with an expensive butterfly needle etc. is not needed, cost required for body fluid sucking operation does not become high.

[0037]When the plunger driving member is constituted by the air cylinder, a plunger driving member drives by the compressed air supplied from the above-mentioned compressed-air-supply member, and it is moved so that the handle of a plunger may keep away to a flange.

[0038]When a multistage type air cylinder is used as the above-mentioned air cylinder, the overall length of the initial state of a plunger driving member can be shortened, and it can do [applying also to the syringe of big capacity easily, or].

[0039]When the above-mentioned plunger driving member is constituted by the balloon, with simple composition, a plunger driving member can be constituted and the cost of a plunger driving member can be reduced.

[0040]The above-mentioned compressed-air-supply member consists of material which has pliability, and when consisting of a rubber bulb which is squeezed and is made to generate compressed air, a plunger driving member can be easily driven only by repeating the operation which squeezes this rubber bulb on a hand or foot.

[0041]In the case of the air cylinder from which the above-mentioned compressed-air-supply member is operated on hand control or foot, a plunger driving member can be easily driven in a similar manner only by operating this air cylinder with a hand or foot.

[Brief Description of the Drawings]

[Drawing 1]The schematic illustration sectional view for explaining the state where the body fluid suction technical aid concerning one working example of this invention was combined with the syringe.

[Drawing 2]Schematic illustration partial notch drawing of longitudinal section for explaining the state where the body fluid suction technical aid shown in drawing 1 is performing sucking

operation.

[Drawing 3]The schematic illustration sectional view for explaining the multistage type air cylinder as an example of a plunger driving member.

[Drawing 4]The perspective view for explaining the desirable example for attaching two or more plunger driving members to the surroundings of a plunger.

[Drawing 5](a) And (b) is the flat-surface sectional view and front view for explaining the state where two or more plunger driving members were attached to the circumference of the bar member of a plunger using Velcro shown in drawing 4.

[Description of Notations]

1 -- Syringe

2 -- Body fluid suction technical aid

11 -- Cylindrical member

11a -- Opening

13 -- Hypodermic needle

14 -- Flange

15 -- Plunger

16 -- Bar member

17 -- Head

18 -- Handle

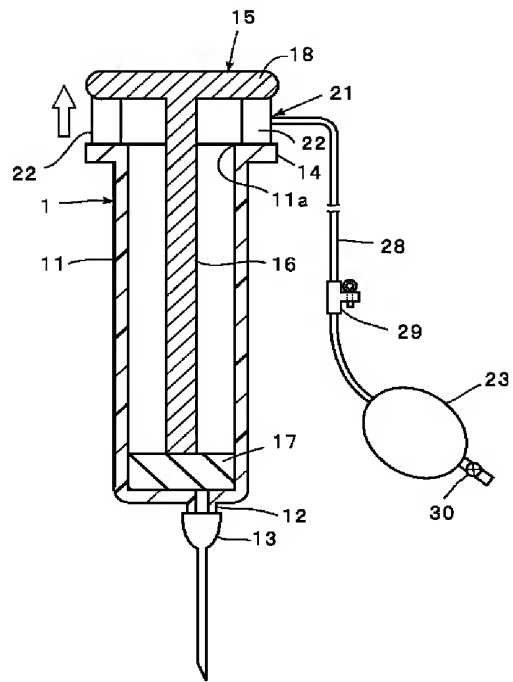
22 -- Plunger driving member

23 -- Compressed-air-supply member

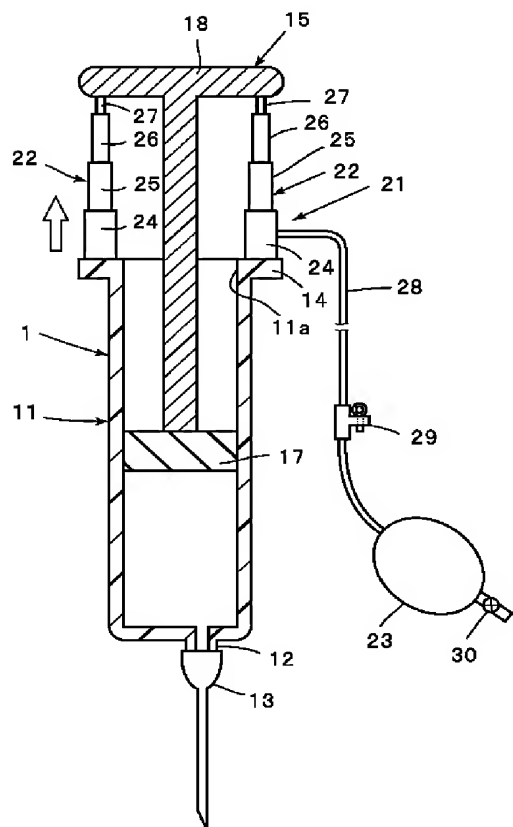
24-27 -- Cylinder

24a -- Air current inlet

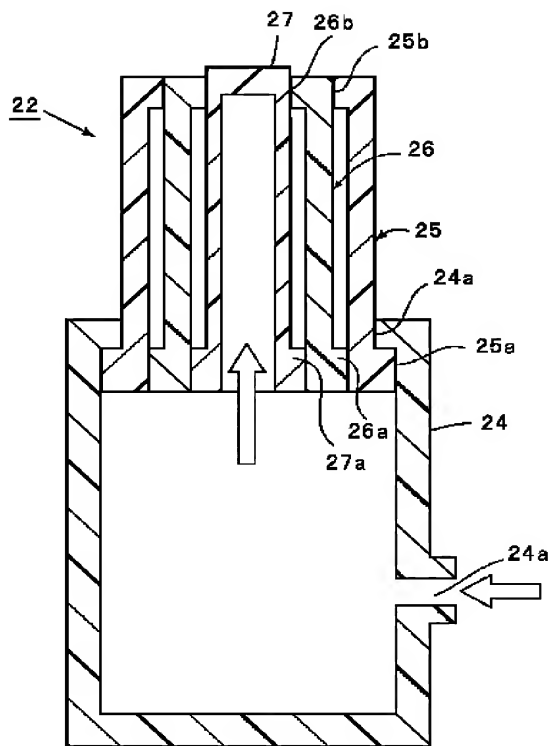
[Drawing 1]



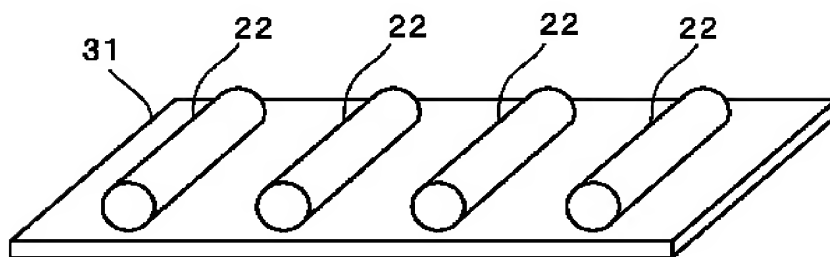
[Drawing 2]



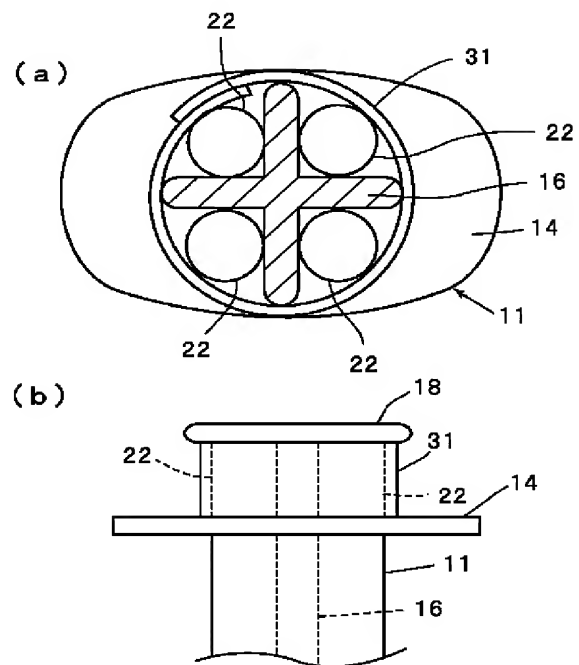
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]